

APPLESOFT II: EXTENDED, FLOATING-POINT BASIC

QUICK REFERENCE GUIDE

SIMPLE VARIABLES

Type	Name	Range
Real	AB	+/- 9.99999999 E+37
Integer	AB%	+/- 32767
String	AB\$	0 to 255 characters

Where A is a letter, B is a letter or digit. Name may be more than two characters, but only first two are significant: AB% and AB3Q\$ are the same integer variable.

ARRAY VARIABLES

Type	Name of Typical Element
Real	AB(3,12,7)
Integer	AB%(3,12,7)
String	AB\$(3,12,7)

Array size is limited by available memory.

ALGEBRAIC OPERATORS

- = Assigns value to variable (LET optional)
- Negation
- ^ Exponentiation
- * Multiplication
- / Division
- + Addition
- Subtraction

RELATIONAL AND LOGICAL OPERATORS

- = Equal
- <> Not equal
- < Less than
- > Greater than
- <= Less than or equal
- >= Greater than or equal.

NOT Logical "Not"
AND Logical "And"
OR Logical "Or"

Relational and logical expressions have value 1 if true, 0 if false. Relational operators can also be used to compare strings.

SYSTEM AND UTILITY COMMANDS

- LOAD Loads a program from tape.
- SAVE Saves a program on tape.
- NEW Deletes current program.
- RUN Executes program starting at lowest line number.
- RUN 477 Executes program starting at line 477.
- STOP Halts execution and tells in which line.
- END Halts execution with no message.
- ctrl C Used in immediate mode to halt program or listing.
- reset Unconditional jump to Monitor. Use ctrl C or 0G to return to APPLESOFT.
- CONT Continues program execution stopped by STOP, END or ctrl C.
- TRACE Debugging aid; lists each line number as it is executed.
- NOTRACE Turns off TRACE.
- PEEK(X) Returns contents of memory location X.
- POKE X,13 Changes contents of memory location X to the value 13.
- WAIT X,Y,Z Waits until contents of location X, when XORed with Z and ANDed with Y, gives non-zero result.
- CALL X Goes to machine-language subroutine beginning at memory location X.
- USR(X) Passes value X to a machine-language subroutine.
- HIMEM: Sets highest memory address available to APPLESOFT program use.
- LOMEM: Sets lowest memory address available to APPLESOFT program use.

EDITING AND FORMAT-RELATED COMMANDS

- LIST Lists entire program.
- LIST X-Y Lists from line X to line Y.
- DEL X,Y Deletes from line X to line Y.
- REM XYZ For writing program comments; ignored by program.
- VTAB Y Moves cursor to line Y (1 to 24).
- HTAB X Moves cursor to position X (1 to 40).
- TAB(X) Only in PRINT statement; moves cursor to position X (1 to 40).
- POS(0) Returns current horizontal position of cursor (0 to 39).
- SPC(X) Only in PRINT statement; puts X spaces between last item printed and next.
- HOME Clears screen and puts cursor at top.
- CLEAR Resets all variables to zero.

EDITING AND FORMAT-RELATED COMMANDS (cont'd)

- FRE(0) Returns amount of memory still available to user.
- FLASH Sets computer output to flashing.
- INVERSE Sets computer output to black on white.
- NORMAL Turns off flashing or inverse output.
- SPEED=X Sets character output rate (0 to 255).
- esc A Moves cursor one space right.
- esc B Moves cursor one space left.
- esc C Moves cursor one space down.
- esc D Moves cursor one space up.
- right-arrow Enters character under cursor into memory, and moves cursor one space right.
- left-arrow Deletes one character from line being typed, and moves cursor one space left.
- ctrl X Cancels line currently being typed.

ARRAYS AND STRINGS

- DIM A(X,Y,Z) Sets maximum subscripts for A; reserves memory space for X+1 * Y+1 * Z+1 real elements, starting with A(0,0,0).
- DIM A\$(X,Y) Sets maximum subscripts for A\$, which may contain X+1 * Y+1 strings elements, each of up to 255 characters.
- LEN(A\$) Returns number of characters in A\$.
- STR\$(X) Returns numeric value of X, converted to a string.
- VAL(A\$) Returns A\$, up to the first non-numeric character, as a numeric value.
- CHR\$(X) Returns ASCII character whose code is X.
- ASC(A\$) Returns ASCII code for first character of A\$.
- LEFT\$(A\$,X) Returns leftmost X characters of A\$.
- RIGHT\$(A\$,X) Returns rightmost X characters of A\$.
- MID\$(A\$,X,Y) Returns Y characters of A\$, starting at character X.
- + Operator used to concatenate strings.
- STORE A Saves numeric array A on tape. Cannot be used to save string arrays, directly.
- RECALL B Loads array back from tape; array B must have been DIMensioned correctly.

INPUT/OUTPUT COMMANDS

(Also see LOAD and SAVE, STORE and RECALL.)

INPUT A\$ Puts ? on screen; waits for user to type a string value for A\$.

INPUT "XYZ";A Prints XYZ on screen; waits for user to type a real number value for A.

GET A\$ Waits for user to type a one-character value for A\$; does not need RETURN key.

DATA X,"Y",Z Establishes list of data elements that can be used by READ statements.

READ A\$ Assigns next DATA element to A\$.

RESTORE Starts READING from first DATA element again.

PRINT "X=";X Prints string X= and value of variable X on screen. Semicolons concatenate printed items, commas separate items into three tab fields. The symbol ? also means PRINT.

IN#6 Takes future input from peripheral device in slot#6, instead of from keyboard (IN#0).

PR#6 Sends output to peripheral device in slot#6, instead of to TV screen (PR#0).

LET X=Y LET is optional; assigns value of Y to variable X.

DEF FN A(X)=X+23/X Defines a function FNA. In later use, the argument of FNA will be substituted for X in the defined expression. FNA(4) would return 9.75

COMMANDS RELATING TO FLOW OF CONTROL

GOTO 347 Branches to line 347.

IF X=3 THEN STOP If the assertion X=3 is true (non-zero), then execution continues. If the assertion is false (zero), then execution jumps to the next numbered line.

FOR X=1 TO 20 STEP 4 ... NEXT X Executes all statements between the FOR statement and the corresponding NEXT, first with X=1, then with X=5, X=9, etc. until X>20, when execution continues after NEXT. STEP size is 1 if not specified.

NEXT X Defines bottom of FOR...NEXT loop. The X is optional.

GOSUB 33 Branches to the subroutine at line 33.

COMMANDS RELATING TO FLOW OF CONTROL (cont'd)

RETURN Marks end of subroutine; returns to statement following most recent GOSUB.

POP Removes one address from RETURN the address stack.

ON X GOTO 397,12,458 Branches to the Xth line number in the list. If X=2, goes to line 12.

ON X GOSUB 397,12,458 Branches to subroutine at the Xth line number in the list.

ONERR GOTO 4500 Subsequent errors cause branch to error-handling routine at line 4500 instead of message and program halt.

RESUME In error-handling routine, causes return to statement where error occurred.

GRAPHICS AND GAME CONTROLS

Low-Resolution Graphics

GR Sets low-resolution graphics; clears top 40 x 40 area to black; bottom 4 lines text.

COLOR=X Sets color (0 to 15) for next plotting.

PLOT X,Y Places colored dot at horizontal coordinate X and vertical coordinate Y. X and Y are from 0 to 39. 0,0 is top left.

HLIN X1,X2 AT Y Draws horizontal line from the point at X1,Y to the point at X2,Y.

VLIN Y1,Y2 AT X Draws vertical line from the point at X,Y1 to the point at X,Y2.

SCRN(X,Y) Returns color on screen at the point X,Y.

High-Resolution Graphics

HGR Sets high-resolution graphics, page 1; clears top 280 x 160 area to black; bottom 4 lines text.

HGR2 Sets high-resolution graphics, page 2; clears entire 280 x 192 screen to black.

HCOLOR=X Sets color (0 to 7) for next plotting.

HPlot X,Y Places colored dot at horizontal coordinate X and vertical coordinate Y. X is from 0 to 279; Y is from 0 to 159 (HGR) or to 191 (HGR2). 0,0 is top left corner.

GRAPHICS AND GAME CONTROLS (cont'd)

HPlot X1,Y1 TO X2,Y2 Draws line from the point at X1,Y1 to the point at X2,Y2. Command may be extended to additional points...TO XN,YN.

SHLOAD Loads a shape table from tape.

DRAW 3 AT X,Y Draws shape definition #3 from a previously loaded shape table, starting at the point X,Y in color set by HCOLOR.

XDRAW 3 AT X,Y Draws shape definition #3 from shape table; color of each point plotted is complement of color on screen at that point.

ROT=X Sets rotation of shape for DRAW or XDRAW. ROT=0 is vertical, ROT=16 is 90 degrees clockwise, ROT=32 is 180 degrees clockwise, etc.

SCALE=X Sets scale (1 to 255) of shape for DRAW or XDRAW.

Game Controls

PDL(X) Returns setting from 0 to 255 of game control X (0 to 3).

PEEK(X-16287) If >127, button on game control X (0 to 2) is being pressed.

PEEK(-16336) "Clicks" APPLE's speaker.

SOME MATH FUNCTIONS

SIN(X) Returns sine of X radians.

COS(X) Returns cosine of X radians.

TAN(X) Returns tangent of X radians.

ATN(X) Returns arctangent, in radians, of X.

INT(X) Returns largest integer less than or equal to X.

RND(1) Returns random real number from 0 to 0.99999999 each time used.

RND(0) Returns last random number again.

RND(-3) Returns 4.48217179E-08. A different fixed number is returned for each different negative argument. After this, RND with positive argument will follow a fixed sequence.

SGN(X) Returns -1 if X<0, 0 if X=0, and 1 if X>0.

ABS(X) Returns absolute value of X.

SQR(X) Returns positive square root of X.

EXP(X) Returns e (2.718289) to the power X.

LOG(X) Returns natural logarithm of X.